

CLAIMS

1. An X-ray topographic system comprising:
an X-ray generator for producing a beam of
X-rays directed towards a sample location; and
a detector positioned to receive X-rays
deflected by a sample at the sample location, the
detector comprising an electronic X-ray detector
having an array of pixels corresponding to the beam
area at the detector.
2. A system according to claim 1, in which the
beam has a divergence of up to 20 milliradians.
3. A system according to claim 1, including an X-
ray optic interposed between the X-ray generator and
the sample location, and arranged to receive said
beam and to transmit the X-rays as a substantially
parallel beam.
4. A system according to claim 1, in which the
detector is positioned to receive deflected X-rays
transmitted through the sample.
5. A system according to claim 1, in which the
detector is positioned to receive deflected X-rays
reflected from the sample.
6. A system according to claim 1, in which the X-
ray generator is adapted to produce a source spot
size of 100 μm or less and has an exit window less
than 20 mm from the target.

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- 1 7. A system according to claim 6, in which the
2 system resolution is about 25 μm and the detector is
3 located 5 - 10 mm from the sample location.
4
- 5 8. A system according to claim 3, in which the X-
6 ray optic is a lobster eye optic comprising a number
7 of parallel, X-ray reflective plates.
8
- 9 9. A system according to claim 8, in which the
10 plates are about 150 μm thick and are coated with
11 gold.
12
- 13 10. A system according to claim 1, in which the
14 detector is a charge coupled device.
15
- 16 11. An X-ray topographic apparatus comprising an X-
17 ray topographic system according to claim 1,
18 stepping means for producing relative stepwise
19 motion between the system and a sample to be
20 inspected, the step size being a function of the
21 beam area, and image processing means for reading
22 out the pixel data of the detector between
23 successive steps.
24
- 25 12. Apparatus according to claim 11, in which the
26 stepping means comprises an XY table movable with
27 respect to the X-ray generator and the detector, and
28 a pair of servomotors arranged to step the XY table
29 in orthogonal directions.
30
- 31 13. Apparatus according to claim 11, in which the
32 stepping means comprises a boule transport device

1 arranged to rotate and axially translate a boule
2 with respect to the X-ray generator and the
3 detector, and a pair of servomotors arranged to step
4 the boule transport device in rotation and
5 translation.

6
7 14. Apparatus according to claim 11, in which the
8 image processing means comprises means for storing
9 the pixel data output from each step, and means for
10 combining data from successive steps to form a
11 composite image.

12
13 15. Apparatus according to claim 11, in which the
14 detector operates in raster scan, and the image for
15 each step is derived by integrating a plurality of
16 scanning frames.

17
18 16. Apparatus according to claim 11, in which the
19 X-ray beam has sufficient divergence to produce
20 doubling of the image at the detector, and in which
21 the image processing means is operative to remove
22 the effects of said image doubling.

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